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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/684,124	10/06/2000	Duane Dixon	00732	3240

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EXAMINER

TRAN, THANH Y

ART UNIT

PAPER NUMBER

2841

DATE MAILED: 08/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/684,124

Applicant(s)

DIXON, DUANE

Examiner

Thanh Y. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 30 is/are pending in the application.
- 4a) Of the above claim(s) 22-29 and 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 and 30 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☒ Interview Summary (PTO-413) Paper No(s) 4.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. Applicant's election without traverse of Group I (claims 1-21 and 30) in Paper No. 4 is acknowledged.

During a telephone conversation with Ms Maria Comninou on 10/24/01 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-21, 30. Affirmation of this election must be made by applicant in replying to this Office action. Claims 22-29, 31 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pao (U.S. 5,386,343) in view of Cnyrim et al (U.S. 4,959,750).

With respect to claim 1, Pao teaches a method for mounting a lead frame to a circuit board having a first and second side (see Fig. 1), the lead frame (comprising elements 26 and 28) having leads (28) with a lead solder area (32) for contact with solder material on the circuit board (10) (see Figs 1 and 3, col. 4, lines 56-61), the method comprising: first reflow soldering of the lead frame (see solder joint 32 in figure 1) and a first set of electrical components (20) on the first side of the circuit board (10) (see Figs. 1 and 3; col. 4, lines 56-61, and col. 5, lines 37-49).

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Pao does not teach the method comprising: inverting the circuit board; and second reflow soldering of a second set of electrical components on the second surface of the circuit board.

Cnyrim et al teaches a circuit board (1, Fig. 1) comprising reflow soldering (see solder joints 11) of a second set of electrical components (2, 3, 4, 8, 9 and 10) on the second surface of the circuit board (1). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the method of Pao by adding a second reflow soldering of a second set of electrical components on the second surface of the circuit board as taught by Cnyrim et al for the purpose of providing easy mounts of electronic components on circuit board and improving the electrical surface-mounted technology.

With respect to claim 2, Pao does not teach the method wherein the ratio of the weight of the frame to the lead solder area is less than about 30 grams per square inch. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to apply a rule of using less than about 30 grams per square inch for a frame in the reference of Pao, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With respect to claim 3, Pao teaches, in figure 1, the first set of electrical components (20) includes low-profile electrical components.

With respect to claim 4, Pao teaches, in figure 1, the lead frame (comprising elements 26 and 28) is formed of a dielectric material with metal leads (see Fig. 1, elements 26 and 28). It should be noted that: the lead frame is inherently formed of a dielectric material (which is included in upper circuit component 26).

With respect to claim 5, figure 1 of Pao shows that the lead frame has a hub.

With respect to claim 6, Pao teaches that each of the electrical components (see Fig. 1, elements 26, 20) of the first set have a ratio of weight to solder area such that they are held in contact with the circuit board (10).

With respect to claim 7, Pao does not teach the attaching the first set of electrical components with an adhesive prior to the first reflow soldering. The Examiner takes Official Notice that it is known to use a method of attaching the electrical components with an adhesive prior to the reflow soldering. Thus, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the device of Pao by including a method of attaching the first set of electrical components with an adhesive prior to the first reflow soldering for the purpose of securing or retaining electrical components on circuit board before soldering.

With respect to claim 8, Pao does not teach that the circuit board comprises FR-4 material. However, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use FR-4 material for making of a circuit board in the prior art of Pao for the purpose of reducing the production costs, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

With respect to claim 9, figure 1 of Pao shows that lead frame (comprising elements 26 and 28) is *substantially* rigid.

With respect to claim 10, figures 1 and 3 of Pao show that leads (28) of the lead frame are substantially coplanar.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 11-21 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pao (U.S. 5,386,343) in view of Griffin (U.S. 5,689,600).

With respect to claims 11 and 30, Pao teaches a method for assembling a surface mount device, the method comprising: providing a circuit board having a first and second side (see Fig. 1) and a plurality of pads (30) for electrical connections on the first side, applying a first mount of solder material on the plurality of pads (see elements 32) of the first side; positioning a first set of electrical components (26, 20) on the first side of circuit board (10) in contact with solder material (see elements 32, 24); positioning a lead frame (comprising elements 26 and 28) having leads (28) so that lead frame is adjacent to the first side of circuit board (10) and leads are in contact with solder material over a lead solder area (32, 24) (see Figs. 1 and 3; col. 4, lines 56-61, and col. 5, lines 37-49); wherein a ratio of the weight of the frame (comprising elements 26 and 28) to the lead solder area (32) is such that the lead frame stays connected to the first side of circuit board (10). Pao does not teach the method comprising: inverting the circuit board; and applying a second amount of solder material on the plurality of pads of the second side of the circuit board; positioning a second set of electrical components on the second side of the circuit board in contact with the solder material; and second reflow soldering with the second side of the circuit board. Griffin teaches a circuit board (12, Fig. 2C) comprising: applying a mount of

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solder material on the plurality of pads (20) of the second side of the circuit board (12); positioning a set of electrical components (14) on the second side of the circuit board (12) in contact with solder material; and second reflow soldering with the second side of the circuit board (12) (see col. 4, lines 55-60). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the method of Pao by applying a mount of solder material on the plurality of pads of the second side of the circuit board; positioning a set of electrical components on the second side of the circuit board in contact with solder material; and second reflow soldering with the second side of the circuit board as taught by Griffin for the purpose of providing easy mounts of electronic components on circuit board and improving the electrical surface-mounted technology.

Claim 12 recites limitations similar to claim 2. Thus, it is rejected for the same reasons.

Claim 13 recites limitations similar to claim 3. Thus, it is rejected for the same reasons.

Claim 14 recites limitations similar to claim 4. Thus, it is rejected for the same reasons.

Claim 15 recites limitations similar to claim 5. Thus, it is rejected for the same reasons.

Claim 16 recites limitations similar to claim 6. Thus, it is rejected for the same reasons.

Claim 17 recites limitations similar to claim 7. Thus, it is rejected for the same reasons.

Claim 18 recites limitations similar to claim 8. Thus, it is rejected for the same reasons.

Claim 19 recites limitations similar to claim 9. Thus, it is rejected for the same reasons.

Claim 20 recites limitations similar to claim 10. Thus, it is rejected for the same reasons.

With respect to claim 21, figure 1 of Pao shows the lead frame (comprising elements 26 and 28) is positioned on and in contact with the first side of the circuit board (10).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kitano et al (U.S. 5,041,901) and Numada (U.S. 5,406,119) teach relevant prior art to the invention.

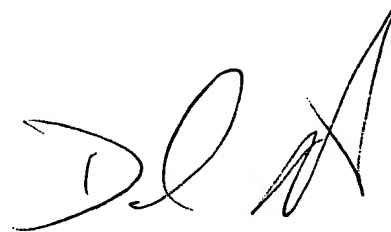
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Y. Tran whose telephone number is (703) 305-4757. The examiner can normally be reached on Monday through Thursday and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin, can be reached on (703) 308-3121. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3431.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TYT

A handwritten signature in black ink, appearing to read 'DM', is positioned above the printed name and title of David Martin.

**DAVID MARTIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800**